Precision Fires Rocket and Missile Systems

Guided MLRS

Full Spectrum Precision With Scalable Effects

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GMLRS DPICM

GMLRS UNITARY

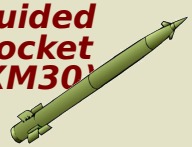
ANY SOLDIER, ANYWHERE, ALL THE TIME

Agenda

- *Program Overview*
- *What GMLRS Brings to the Warfighter*
- *GMLRS Urgent Need*
- *Conclusion*

Full Spectrum Capability

GMLRS Evolution to Precision Strike



	Basic Rocket (M26)	Extended Range Rocket (M26A1 / A2)	Guided Rocket (XM30)	Guided Unitary Rocket	Cargo / Unitary P3I
	1980	EVOLUTIONARY	1998	REVOLUTIONARY	2000 +
User Requirements					
Range	32 Km	45 Km	60+ Km	60+ Km	70+ Km
Precision / Accuracy		No Load Detent	Inertial Measurement Unit (IMU) / Global Positioning System (GPS) Aided	GPS Aided / IMU	GPS Aided / IMU
Flexibility		Deeper Targets Farther Laterally "General Support (GS)" Mission	Deeper Targets Farther Laterally "GS-Reinforcing" Mission	Deeper Targets Farther Laterally "GS" Mission	R, GSR
Payload	Dual Purpose Improved Conventional Munition (DPICM)	DPICM	DPICM	Unitary with Multi-Option Fuze	Not ID'd
Maneuver Safety	5% Dud Rate	4% Dud Rate / < 1% with M101	Threshold: < 2 / 4% Dud Rate Objective: 0% Dud Rate	NA	TBD
Targets		Soft	Soft	Hard Stationary Point Targets Collateral Damage Sensitive	TBD
Survivability	—	Set Back	Set Back Dwell Time	Soft Area Targets Set Back Dwell Time	Set Back Dwell Time

Area — Full Spectrum With Scalable Effects & Range — Point

Any Soldier, Anywhere, All The Time

GMLRS Variants

In Production

GMLRS DPICM

Produce 450 by 30 Sep 06

Unitary Phase I

Develop In FY05-06

Start Production In FY07

Unitary Phase II

STO In FY08-11

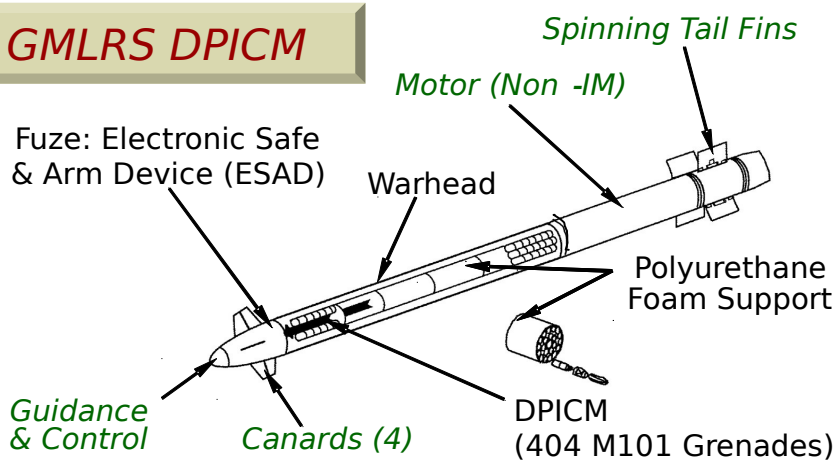
Start Development In FY11

GMLRS P3I

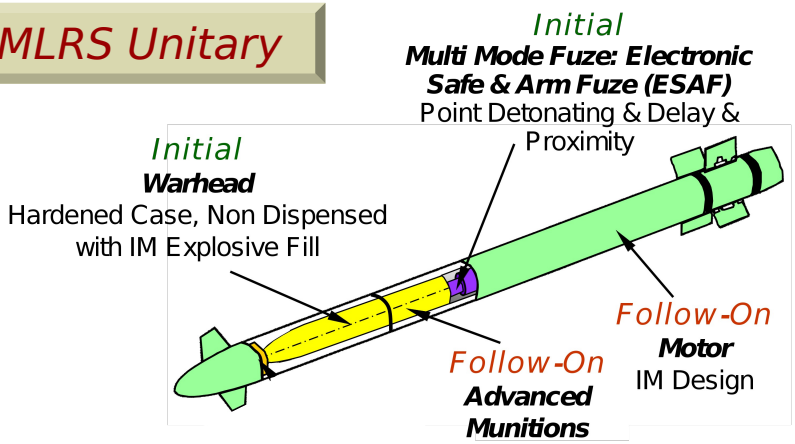
Spiral Development for Full Spectrum Precision Capability

GMLRS DPICM / GMLRS Unitary Comparisons

GMLRS DPICM



GMLRS Unitary



Common Design Items Between GMLRS DPICM & Unitary

- ***Guidance & Control***
- ***Canards***
- ***Motor = Non - IM***
- ***Pod***
- ***Common SW***
- ***Maintainability***
- ***Supportability***

Design Items for Initial

- ***Warhead with IM Design***
- ***Multi Mode Fuze: <u>DPICM ESAD Modified to Unitary ESAF</u> with PD, Proximity & Delay Capabilities***

Design Items for Follow-On

- ***Motor = IM Design***
- ***CAIV Initiatives***
- ***Rocket Pods***
- ***Other Technology Opportunities (OTO) - Pit Stop***

POTENTIAL GMLRS Unitary Spiral Design Improvements For Future Increments and / or Blocks

GMLRS DPICM Provides Full Spectrum Support

GMLRS DPICM is the Foundation of Future Precision (Unitary) and Smart Munitions

- ***Increased Range, Accuracy, and Effectiveness***
- ***Decreased Logistics Throughput Per Target***
- ***Basis for Transition to Precision / Smart Rocket Munitions***
- ***HIMARS + GMLRS: Key Systems in Fires Brigade***
- ***Mitigates the M26 Shelf Life Issue***
- ***Reduction of Unexploded Ordnance (UXO)***

Provides Spiral Development Improvements that Support Fires Unit of Action Munitions Capabilities (ATR, Loiter, BDA, Intel . . .)

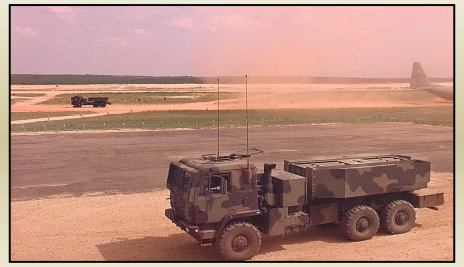
GMLRS Value Added to the War Fighter

Assumptions: ***All Rounds Fired at Their Max Range, 30% Expected Fractional Damage, 50m Target Location Error, Against a Given Target***

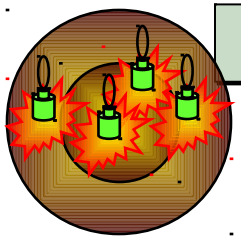
MUNITION	*ROCKETS*	*COMMITMENT*
M26 (32km)	**75 rockets**	**6 launchers – 19 min, 1 M270A1 Reload = 1 Battery**
M26A2 (45km)	**122 rockets**	**6 launchers – 19 min, 5 M270A1 Reloads = 1 Battery**
M30 (70+km) GMLRS	**15 rockets**	**2 launchers – 2 min, No M270A1 Reloads = 1 Platoon (-)**
M30 (70+km) GMLRS	**15 rockets**	**3 launchers – 2 min, No HIMARS Reloads = 1 Platoon**

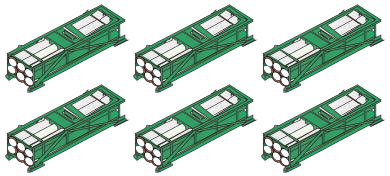
GMLRS Allows the Other Launchers Within the Battery to Service Several Targets Simultaneously

Decreased Logistics Throughput



Basic Rocket



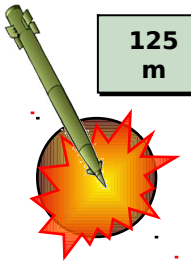


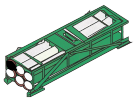
36 Rounds

30% Damage Level

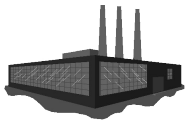
Effectiveness Comparison

Guided Unitary





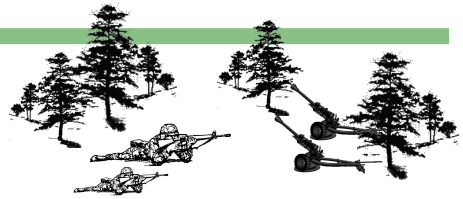
6 or less Rounds



Infrastructures

Guided Unitary Target Elements

Bunkers

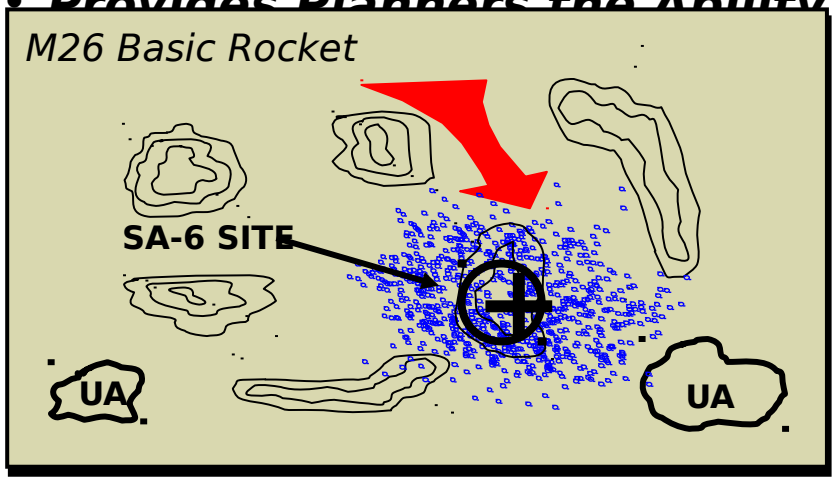


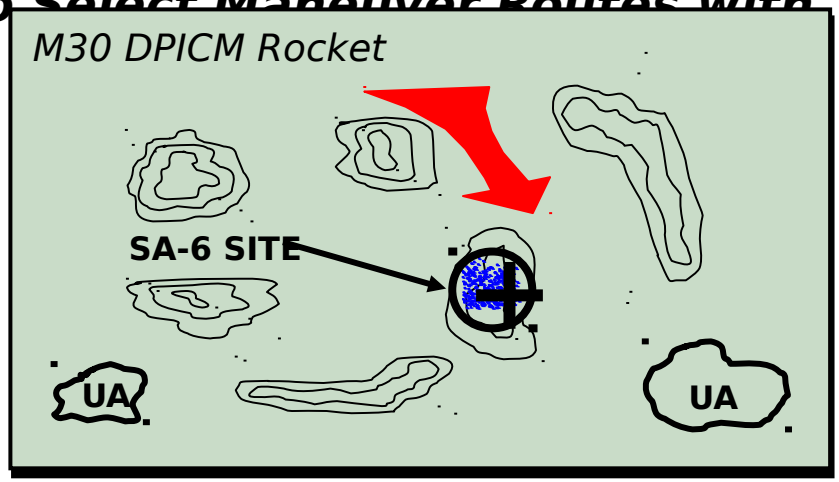
Personnel / Materials

Multiplicative Effect of Reducing the Logistics Throughput = Decreased Fuel, Transports, Transporters, Maintainers, Medics, Cooks, Etc.

Bottom Line

- ***GMLRS is a Vast Improvement Over Our Current Free-Flight Rockets***
- ***Increased Effectiveness with Fewer Rockets***
- ***Allows for More Targets to be Serviced in the Same Time Frame***
- ***Reduces the Hazardous Area for Maneuver Forces***
- ***Provides Planners the Ability to Select Maneuver Routes with***





Significantly Improved Maneuver Safety – 95% Reduction In Duds and a 99.6% Reduction In Hazardous Area

Latest on SDF Status

KDI Design

- Critical Failure in M915, Sister Program
- “Late Riser” Issue
- Will Still Conduct PQT Although Results are Questionable
- KDI is Working on Get Well Plan

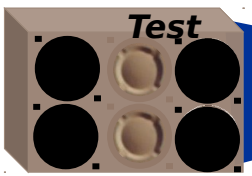
Bulova Design

- Will Deliver SDFs For Two-Rocket Design Verification Test
- Given a Successful DVT Will Move Immediately to PQT
- Pyro-Technical Design Based on Current M101

Junghans–Giat and ATK

- Strategic Decisions To Withdraw From Consideration

SDF Path Forward for GMLRS

	FY05		FY06	FY07
	LINE QUALIFICATION	PRODUCTION QUALIFICATION FLIGHT TEST	LEADER	
KDI **Leader In SDF Production**	***(Inert Fuzes & Inert Grenade Bodies)*** ***1,000 for Lone Star Army Ammo Plant*** ***6,000 Inert Fuze / Inert Grenade for Lockheed Martin in***	 Hot Cold Ambient ***9 Rocket Payload - 3,456 Live Fuzes / Inert Grenades*** ***Incorporate Partial Stockpile - To - Target Sequence and Accelerated Shelf-Life Testing*** ***12 Rockets Each Hot Long, Hot Short, Cold***	***If Affordable and Effective .....*** ***.....Procure No More Than*** *1Million*	***Procure No More Than*** *2.8 Million* ***SDFs From Either Source***
	FOLLOWER CANDIDATES	DESIGN VERIFICATION TEST	FOLLOWER	
	JUNGHANS - GIAT ATK, or Bulova ***Second Source in SDF Production***	***Production Verification Test***  *Two Rockets* ***Down Select*** *"Second Source"*	***Production Qualification Testing***	***Dec 06, Deliver First Rockets with SDFs to the UK***

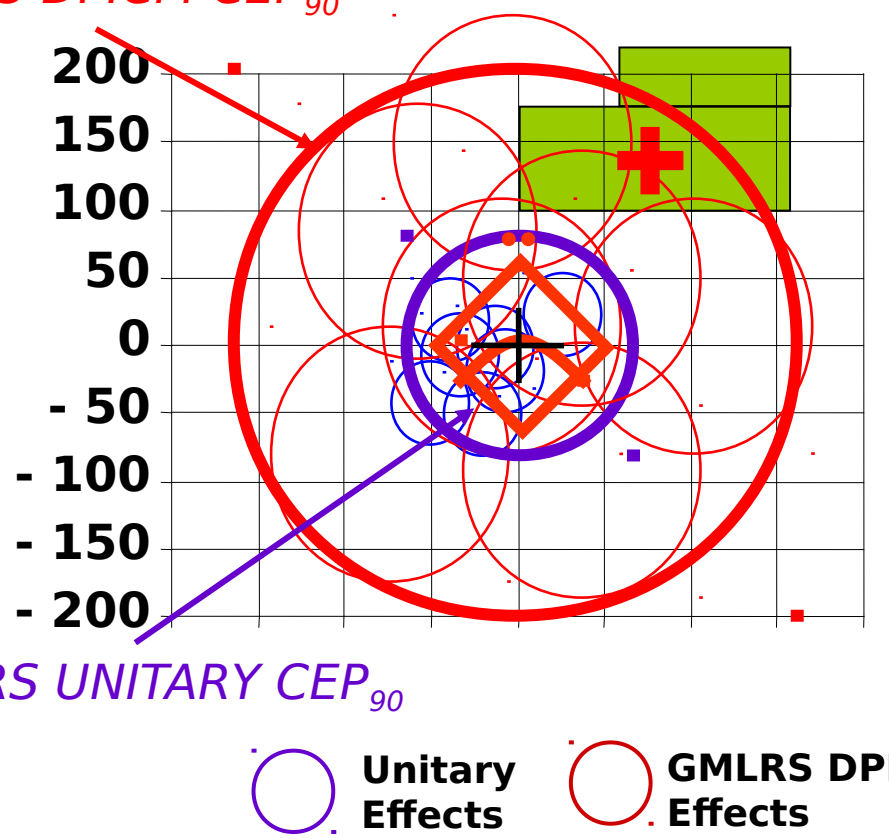
MAY BE TRUNCATED

Two Qualified SDF Sources by FY05

GMLRS Unitary Warhead Collateral Damage Reduction

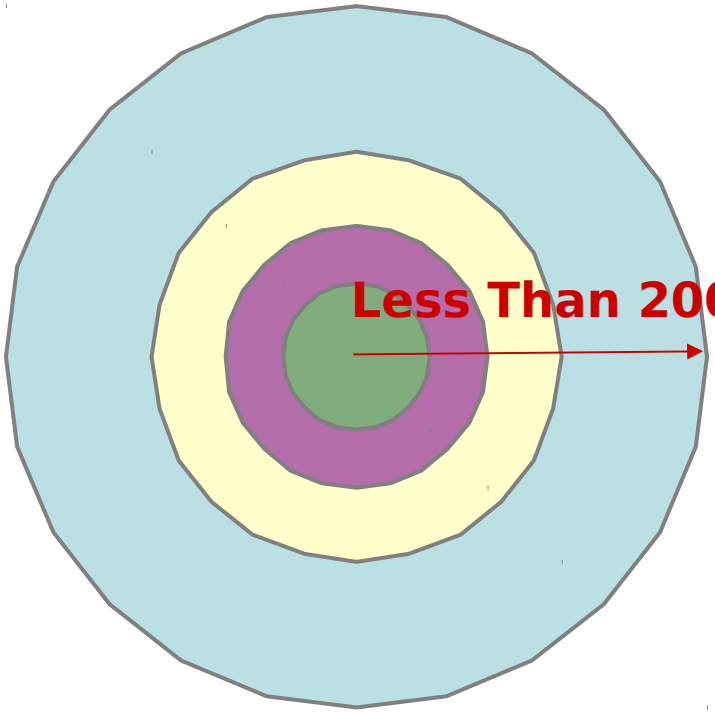
Point Target in Restrictive Environment

Engagement with randomly generated impacts at 40km range, TLE = 50m



Approximation of GMLRS Unitary and DPICM Warhead Scalable Effects

- GMLRS DPICM Submunition
- GMLRS Unitary Air Burst
- GMLRS Unitary Ground Burst
- GMLRS Unitary Delay

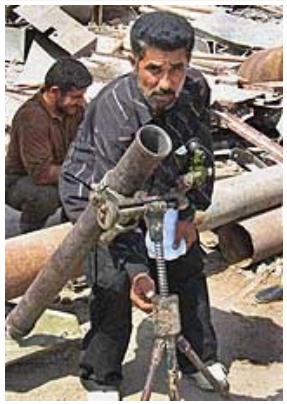


GMLRS Unitary Effects Are Concentrated About Point of Detonation and Quickly Taper Off

Scalable Effects

DPICM

Proximity Fuze



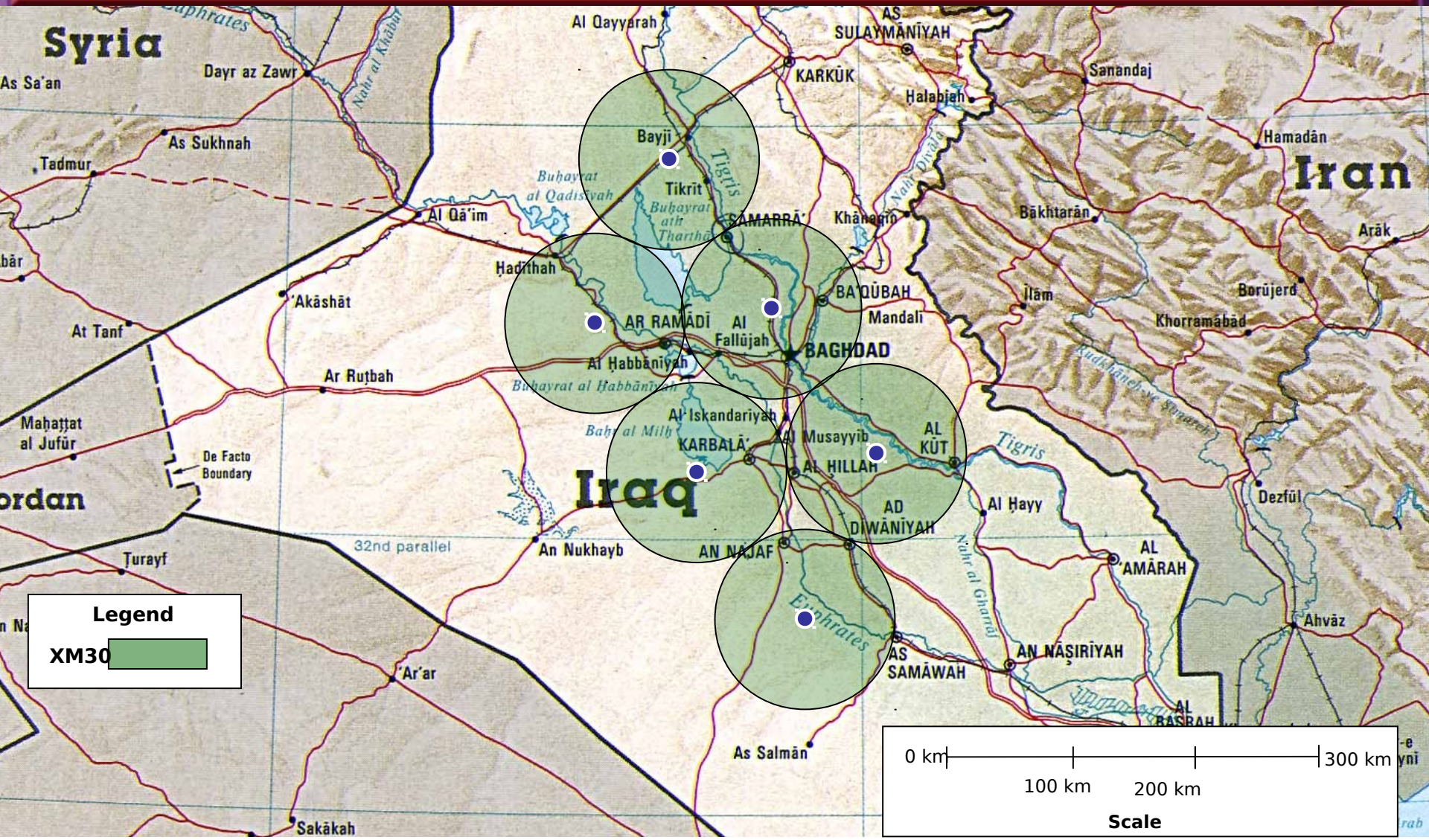
Point Detonating Fuze

Delay Fuze

Military Equipment Shielded by Civilian Buildings

Iraqi Bunker

Scalable Area of Influence



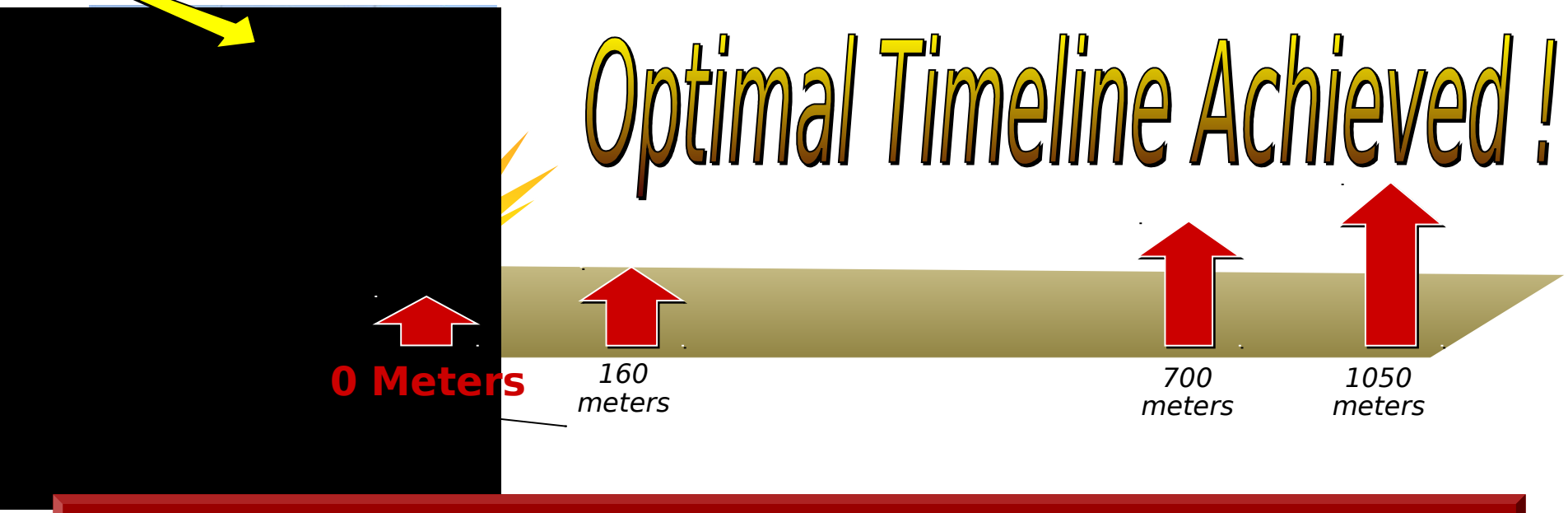
Scalable Response Time

RADAR = > > Launcher w/Enhanced C2 = > > Guided Unitary Rocket

Auto processing turned on at Radar

Stay Hot Shoot Fast

Optimal Timeline Achieved !



Effects Timelines Reduced to Less Than 2 Minutes

GMLRS Unitary Urgent Need

UMR Facts

- ***Begin Deliveries of Accelerated GMLRS Unitary Rockets As Soon As Possible, but NLT Jun 05***
- ***Expedite Deliveries to CENTCOM Theater***
- ***Field 75% of a Battery Basic Load (486 Rockets)***
- ***Field A Dual Mode Fuze Capability (Point Detonate and Delay)***
- ***Priority is M270A1 First and HIMARS Second - Both By Jun 05***
- ***Qualify the Rocket as Safe and Suitable - AEC Assessment will Include Effectiveness***
- ***Achieve a Limited Safety Release***
- ***Obtain Urgent Material Release***
- ***Upgrade Additional Launchers to a GMLRS Capability***
- ***Spiral GMLRS Unitary Initial Capability to Full ORD Requirements***

Path Forward

- ***Urgent Need Statement (UNS)***
  - *"This is What I Want"* ***(LTG Metz, 12 Oct 04)***
- ***Validated Urgent Need Statement (UNS) by G-3/5/7***
  - *"We Agree You Need It"* ***(LTG Lovelace, 06 Jan 05)***
- ***IM Waiver Request***
  - *"JCB Recommends Waiver Approval and Paper JROC"*
- ***Safety Assessment (AMCOM)***
  - *"It Will Work with Manageable Risk"*
- ***Acceptance of Conditions by Gaining Command***
  - *"We will Take It"* ***(LTG Metz)***
- ***Urgent Material Release Approval***
  - *"Send It"* ***(MG Pillsbury)***

Any Soldier, Anywhere, All The Time

GMLRS Unitary Schedule

GMLRS (DPICM)

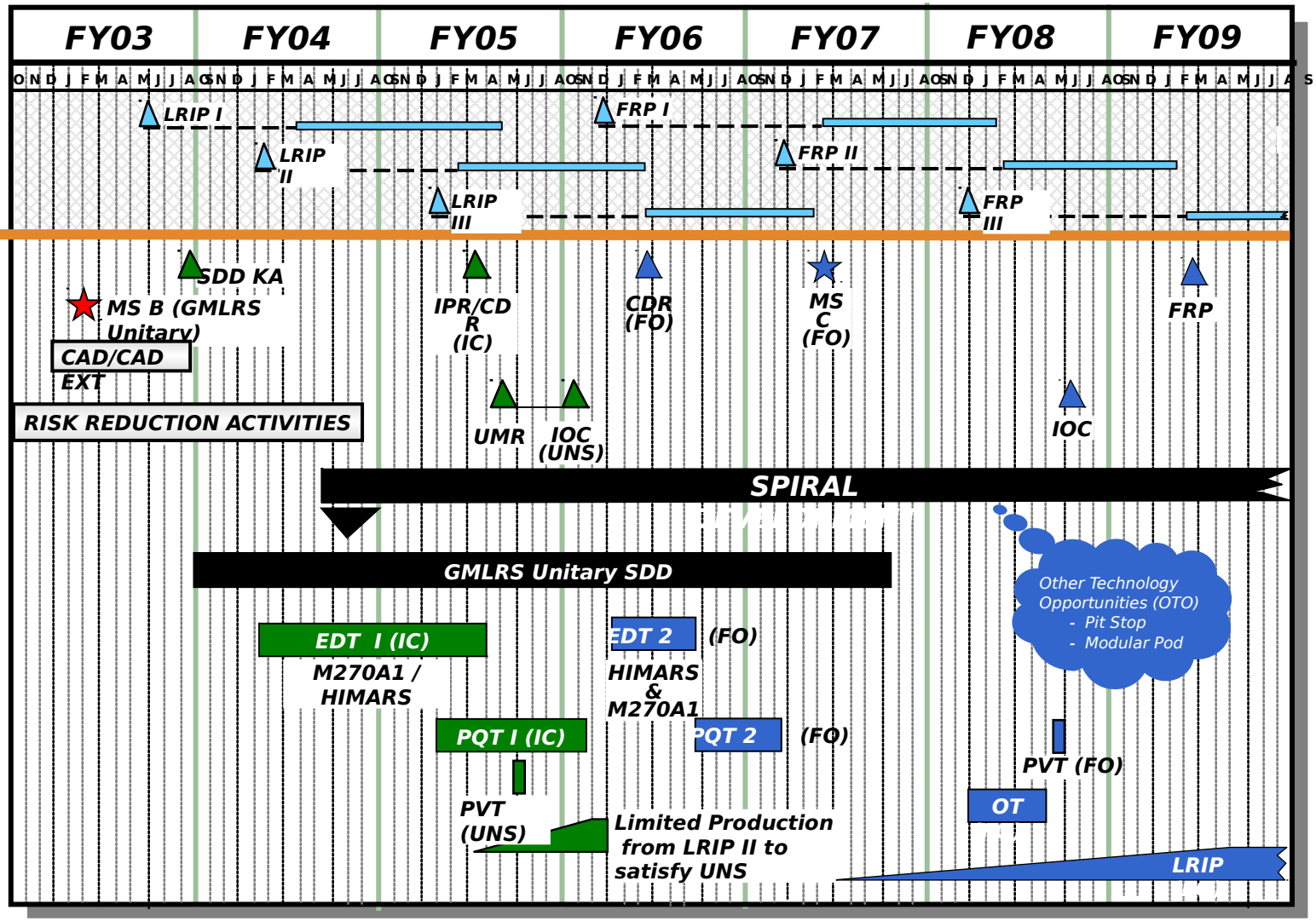
GMLRS Production Contracts

GMLRS Unitary

UMR CONFIGURATION
Point Detonate & Delay Fuze Capabilities
(Safe and Suitable)

INITIAL CONFIGURATION
Phase I (HE)
Point Detonate, Delay, Air Burst Fuze Capabilities

FOLLOW-ON
Phase II: "Initial" Plus IM, Trajectory Shaping, Cargo Studies & New Pod
(ORD Requirements)



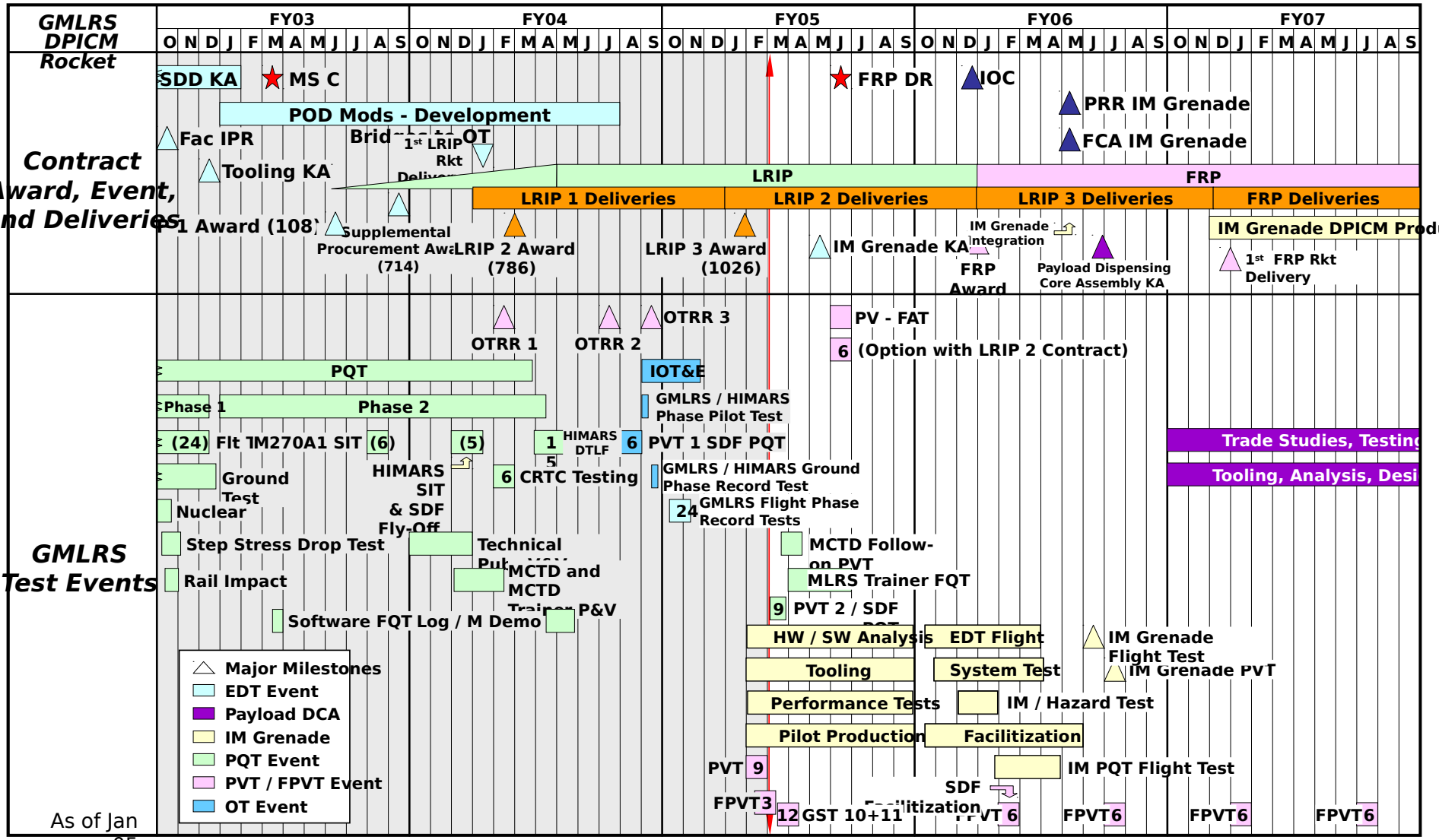
Conclusions

- ***GMLRS is a Significant Capability Available Today***
- ***Together with HIMARS Creates Unprecedented Capabilities at an Affordable Cost***
- ***Is Needed by the Warfighter TODAY !***

Bottom Line: GMLRS Provides Unprecedented Full Spectrum and Scala

Back-Up

GMLRS DPICM Schedule



As of Jan 05

GMLRS DPICM

System Description

- ***Integrated Guidance & Control (G&C) Package***
- ***Achieves Greater Range & Precision Accuracy***
- ***Improved Accuracy Reduces the Number of Rockets Required to Defeat Targets***
- ***5 Nation Cooperative Development Program***

Key Performance Parameters (KPPs)

- ***Range: 60 km (max) / 15 km (min)***
- ***Effectiveness: 30% Expected Fractional Damage***
- ***Rocket Reliability: Threshold: 92%; Objective: 95%***
- ***Safety and Health: <2% Hazardous***

Accomplishments Last Six Months/Status

- ***Log and Maintainability Demo***
- ***Successful Operational Test (OT)***
  - ***Ground Phase Conducted 20 Sep-1 Oct***
  - ***Flight Phase Conducted 13 Oct-3 Nov***
- ***LRIP III Contract Awarded 31 Jan 05***
- ***On track for FRP Decision***

Next Six Months

- ***Stockpile-to-Target Sequence (4 x HIMARS)***
- ***PVT-2/ PQT of KDI SDF, 25 Mar 05***
- ***FRP IPR, Jun 05***
- ***Multi-Year Procurement Decision Package***

GMLRS Unitary

System Description

- ***Provides Complimentary Capability to DPICM*** *(where use of submunitions are not effective or desirable)*
- ***Single 200 lb High Explosive Warhead***
- ***Effective Against Critical Area & Point Targets Located in Restrictive Terrain***

Key Performance Parameters (KPPs)

- ***Min / Max Range: 15 / 60 km***
- ***Effectiveness: Functional Kill with Point Detonating & Delay Fuzes***
- ***Effectiveness: 30% EFD with Proximity Fuze***
- ***Rocket Reliability: Threshold: 92% Objective: 95%***

Accomplishments Last 6 Months / Status

- ***EDT-1, 1a & 2 Flight Test in PD Mode***
- ***GMLRS Unitary HE Warhead Arena Tests***
- ***Converted to 3 - Inch Standard Fuze Design***
- ***EDT-4 and 8 in Delay Mode***
- ***EDT-7 in Proximity Mode***

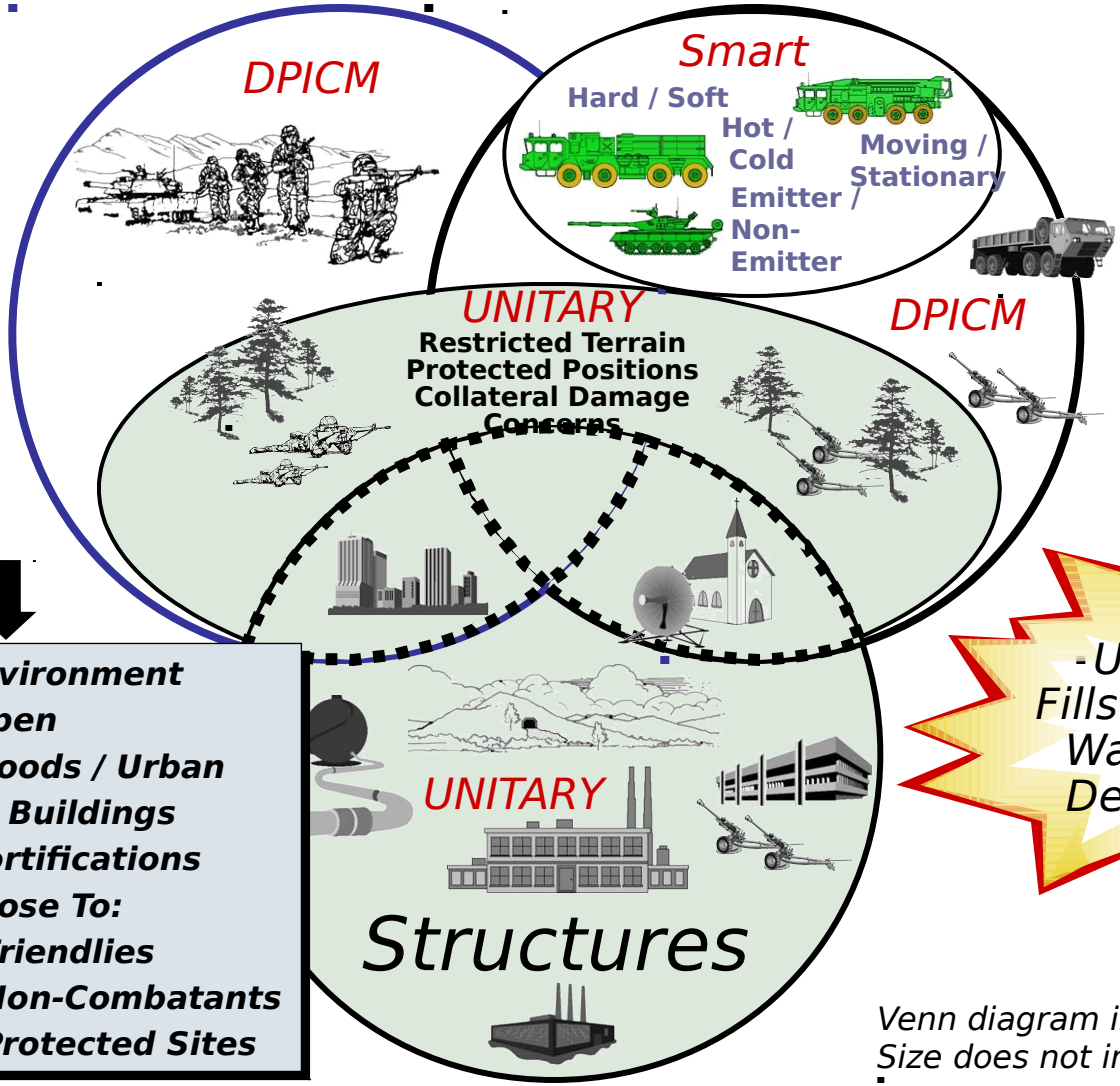
Next 6 Months Activities

- ***Field Contingency Quantity of Rocket to OIF / OEF***
- ***EDT Ground Tests***
- ***Complete EDT Flight Tests***
- ***LIT/SIT With HIMARS & M270A1***
- ***Start Production Qualification Testing***

Target Sets
Guided Rocket Family of Munitions

Target Categories
1. Personnel
2. Materiel
3. Structures

Payloads
1. DPICM
2. Unitary
3. Smart



Target

Elements
- Personnel
- Vehicles
- Structures
- Weapons

Environment
- Open
- Woods / Urban
- In Buildings
- Fortifications
- Close To:
  - Friendlies
  - Non-Combatants
  - Protected Sites

- Unitary Fills a Critical Warfighter Deficiency

Venn diagram intended to describe ta
Size does not indicate target density.

GMLRS Provides Significant Capability

The Complementary Nature of GMLRS with Unitary and DPICM Warheads Make GMLRS a Formidable Weapon in All Future Contingency Operations

Demonstrated Accuracy - Demonstrated Lethality

Any Soldier, Anywhere, All The Time

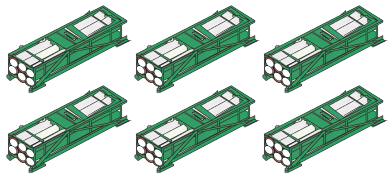
GMLRS Unitary
Operational Effectiveness Example

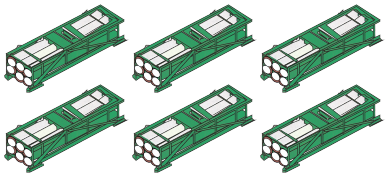
Basic Rocket — 36 Rounds => 1 Target

Guided Unitary — 36 Rounds => 6 or more Targets

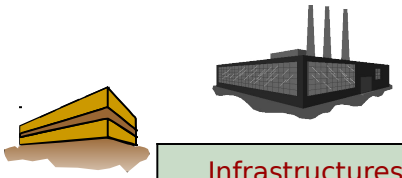
30% Damage Level

Effectiveness Comparison



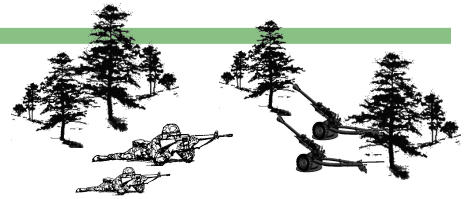


GMLRS Unitary Target Elements



Infrastructures

Bunkers



Personnel / Materials

GMLRS is more effective than Unguided Rockets against all targets

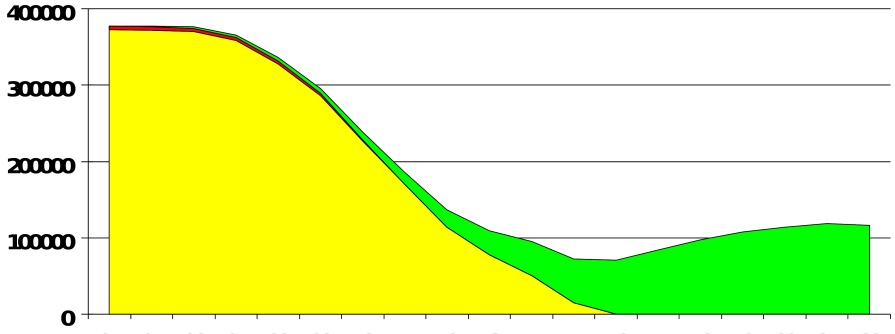
IM Waiver & Compliance Summary

System Description

- ***GMLRS Rockets have an Integrated Guidance and Control (G&C) Package & are Used by M270A1 & HIMARS Launch Platforms***
- ***GMLRS Rockets Achieve Greater Range & Precision Accuracy***
- ***GMLRS Rockets Reduce UXO***
- ***Replaces Current Inventory of Aging M26 Basic Unguided Rockets***
- ***Two Variants-GMLRS DPICM & GMLRS Unitary***

MLRS Rocket Inventory Concept

PB06 (06 POM / BES 28 Jan 05 WARBUCS)



	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22
GMLRS	213	1188	2185	3102	4353	6626	10494	15865	22797	31944	44727	57882	71102	84459	97335	107530	114123	118343	115995
ER-MLRS	4128	4128	4128	4128	4128	2826	1362	0	0	0	0	0	0	0	0	0	0	0	0
M26	372834	371964	369816	368194	327642	286308	228938	169980	113826	77442	50100	14802	0	0	0	0	0	0	0

Waiver Request

- ***GMLRS DPICM & the Unitary Urgent Need (UNS from MNC-I) Quantities are <u>not</u> IM Compliant***
- ***GMLRS DPICM will have IM Motor Improvement Production Cut-in FY07; RDT&E Effort in Place for Warhead Improvement***
- ***GMLRS Unitary SDD Includes System Level IM Compliant Design; UNS Precludes IM Motor Availability & Warhead is Initial IM Design***
- ***Request Waiver for Limited Production Army & USMC GMLRS Rockets Through FY06 (~4,662 of Quantity)***

Correction of Deficiencies

- ***Replacement of Non-Compliant Explosive M101 Grenade Fill with Compliant Fill for GMLRS DPICM***
- ***IM Motor Being Developed under GMLRS Unitary SDD to be Cut Into GMLRS DPICM Production After Qualification***
- ***Trade Studies of Alternate Launch Pod Container Materials for Improved IM Response with Follow-on Redesign Activity…Accelerated***
- ***Payload Dispensing Core Assembly IM Characterization Test to Determine Vulnerability to IM Stimuli; Trade Studies and Potential Redesign Effort to Follow…Accelerated***
- ***GMLRS Unitary SDD Contains Requirement for***